

AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application.

1-11. (Cancelled).

12. (Currently Amended) A The system of claim 10, for providing one or more virtual volumes, comprising:

a host system;

a set of storage devices, each of which includes physical block addresses that stores data; and

a network switch system connecting the host system and the set of storage devices, and configured to define and manage a virtual volume associated with data distributed across the physical block addresses, the network switch system including:

a first virtualization layer that maintains first tier objects including information reflecting a relationship between the physical block addresses and one or more logical partitions of virtual volume data,

a second virtualization layer that maintains second tier objects including information reflecting a logical configuration of the virtual volume,

a set of storage processors separated into first tier storage processors associated with the first virtualization layer and second tier storage processors associated with the second virtualization layer, wherein each storage processor

includes a virtualization state manager (VSM) that is configured to manage a local version of the virtual volume, and

a switching fabric interconnecting the first tier storage processors and the second tier storage processors;

wherein the network switch system manages the virtual volume for the host system using the first and second tier objects.

13. (Original) The system of claim 12, wherein each storage processor VSM is configured to manage any of the mappings maintained by the respective storage processor.

14. (Original) The system of claim 12, wherein each storage processor includes a Master VSM (MVSM) that is either in an active or inactive state.

15. (Original) The system of claim 14, wherein when activated, the MVSM is configured to interact with the VSMs of the storage processor to build a current system image of the virtual volume.

16. (Original) The system of claim 15, wherein the current system image of the virtual volume includes information reflecting which storage processors are connected to selective ones of the storage devices and which storage processors are connected to the host system.

17. (Original) The system of claim 14, wherein the network switch system designates a single storage processor as a Master Virtualization Storage Processor (MVSP) by activating the MVSM in the designated MVSP.
18. (Original) The system of claim 17, wherein the MVSP is configured to interface with a Virtualization State Manager DataBase (VSMDB) stored in the set of storage devices to build a system image of the virtual volume.
19. (Original) The system of claim 18, wherein the VSMDB is distributed across the storage devices such that each storage device includes a local VSMDB including virtualization objects associated with any storage processors connected to the respective storage device.
20. (Original) The system of claim 19, wherein the MVSP collects the virtualization objects from each local VSMDB to build the system image.
21. (Original) The system of claim 20, wherein the MVSP sends the system image to a network switch system managing component to build a global system image reflecting a logical view of the virtual volume.
22. (Original) The system of claim 21, wherein the global system image includes first tier objects having object definitions associated with the logical partitions and second tier objects having object definitions associated with the logical configuration of the virtual volume and references to selective ones of the first tier objects.
23. (Original) The system of claim 22, wherein the network switch system managing component includes a Virtualization Coherency Manager (VCM) that maps the first tier

objects to the first tier storage processors and maps the second tier objects to the second tier storage processors.

24. (Original) The system of claim 23, wherein the VCM distributes the first tier objects to the first tier storage processors before distributing the second tier objects.

25. (Original) The system of claim 24, wherein the VCM directs the first tier storage processors to expose their first tier objects to the second tier storage processors such that the second tier storage processors discover selective ones of the first tier objects.

26. (Original) The system of claim 25, wherein the second tier storage processors determine logical relationships between selective ones of the second tier objects and the first tier objects.

27. (Currently Amended) A The system of claim 10, for providing one or more virtual volumes, comprising:

a host system;

a set of storage devices, each of which includes physical block addresses that stores data; and

a network switch system connecting the host system and the set of storage devices, and configured to define and manage a virtual volume associated with data distributed across the physical block addresses, the network switch system including:

a first virtualization layer that maintains first tier objects including information reflecting a relationship between the physical block addresses and one or more logical partitions of virtual volume data,

a second virtualization layer that maintains second tier objects including information reflecting a logical configuration of the virtual volume,

a set of storage processors separated into first tier storage processors associated with the first virtualization layer and second tier storage processors associated with the second virtualization layer,

a switching fabric interconnecting the first tier storage processors and the second tier storage processors, and

~~wherein the network switch system~~ includes a Virtualization Coherency Manager (VCM) that manages the virtual volume using the first and second tier mappings;

wherein the network switch system manages the virtual volume for the host system using the first and second tier objects.

28. (Original) The system of claim 27, wherein the VCM selects one of the storage processors as a Master Virtualization Storage Processor (MVSP) that is configured to build a current system image.

29. (Original) The system of claim 28, wherein the MVSP creates first and second tier object definitions corresponding to the virtual volume based on information collected from selected ones of the storage devices.

30. (Original) The system of claim 29, wherein the VCM assigns the first tier object definitions to selective ones of the first tier storage processors and the second tier object definitions to selective ones of the second tier storage processors.

31-38. (Cancelled).

39. (Currently Amended) A The method of claim 32, for providing one or more virtual volumes in a virtualization storage environment including a host system, a set of storage devices, each of which includes physical block addresses that stores data, and a network switch system connecting the host system and the set of storage devices, and configured to define and manage a virtual volume associated with data distributed across the physical block addresses, the method comprising:

providing a first virtualization layer that maintains first tier objects including information reflecting a relationship between the physical block addresses and one or more logical partitions of virtual volume data;

providing a second virtualization layer that maintains second tier objects including information reflecting a logical configuration of the virtual volume;

providing a set of storage processors separated into first tier storage processors associated with the first virtualization layer and second tier storage processors

associated with the second virtualization layer, wherein each storage processor includes a virtualization state manager (VSM), ~~and the method further includes;~~

managing, by the network switch system, the virtual volume for the host system using the first and second tier objects; and

managing, by each VSM, a local version of the virtual volume.

40. (Original) The method of claim 39, further including:

managing, by each storage processor VSM, any of the mappings maintained by the respective storage processor.

41. (Original) The method of claim 40, wherein each storage processor includes a Master VSM (MVSM) that is either in an active or inactive state.

42. (Original) The method of claim 41, further including:

activating a selected storage processor's MVSM to allow the activated MVSM to interact with the VSMs of the storage processor to build a current system image of the virtual volume.

43. (Original) The method of claim 42, wherein the current system image of the virtual volume includes information reflecting which storage processors are connected to selective ones of the storage devices and which storage processors are connected to the host system.

44. (Original) The method of claim 41, further including:

designating a single storage processor as a Master Virtualization Storage Processor (MVSP) by activating the MVSM in the designated MVSP.

45. (Original) The method of claim 44, further including:

interfacing, by the MVSP, with a Virtualization State Manager DataBase (VSMDB) stored in the set of storage devices to build a system image of the virtual volume.

46. (Cancelled).